PROPERTIES OF WOOD PLASTIC COMPOSITES FROM PETAI BELALANG (Lewcaena lewcocephala)

LARISSTINA SINTEH



2006

ACKNOWLEDGEMENTS

Firstly, I would like to take this opportunity to express my special thanks to God for His blessing and give me strength in completely my final project. Secondly, I would like to express my deepest appreciation sincere gratitude to my project advisor, Mr. Shaikh Abdul Karim Yamani B. Zakaria, for the teaching, guidance, advice and immeasurable patience that allowed me to take on this final project. I would also like to thank my lecturer of WTE 375, Prof. Madya Dr. Jamaludin Kasim who also provided me with invaluable help and guidance in this final project reports. In addition, I would like to acknowledge the Wood Technology Workshops for providing me with the facilities and equipment that made this project possible.

There are many more to which I am grateful for contributing to various aspects of this project. The staffs at the Wood Technology Workshops, Mr. Sardey and Mr. Shahril were contributes invaluable help. In particular, I would like to thank Mr. Marzuki, Civil Engineering lecturer for his contribution associated raw materials. I would also like to thank Puan Sa'adiah Sahat, Statistic lecturer for her contribution in this final project. This project could have been not completed without the expertise and assistance of these people.

Finally yet importantly, a very special thanks goes out to my beloved parents, siblings and my lovely one for their support, encouragement and inspiration. Not forgotten to express my thanks to all my friends specially Veronica Gisin who are involved in completing this project either directly or indirect. Without them, I would not have been able to complete this project.

iv

TABLE OF CONTENTS

PAGE

| PROJECT TITLE. | i |
|-----------------------|------|
| APPROVAL SHEET | ii |
| DEDICATION | iii |
| ACKNOWLEDGEMENTS | iv |
| TABLE OF CONTENTS | v |
| LIST OF TABLES | viii |
| LIST OF FIGURES | ix |
| LIST OF PLATES | x |
| LIST OF ABBREVIATIONS | xi |
| ABSTRACT | xii |
| ABSTRAK | xiii |

CHAPTER ONE

| 1.0 Introduction | 1 |
|-----------------------|---|
| 1.1 Problem Statement | 3 |
| 1.2 Justification | 3 |
| 1.3 Objectives | 3 |

CHAPTER TWO

| 2.0 | Literati | are Review | 4 |
|-----|---|-----------------------------------|---|
| 2.1 | 2.1 Introduction Wood Plastic Composite | | |
| | 2.1.1 | Wood Plastic Composite Background | 6 |
| | 2.1.2 | The Benefits of WPCs | 8 |

| | 2.1.3 | WPC Properties | 9 |
|-----|----------|------------------------------------|----|
| | 2.1.4 | WPCs and fire | 10 |
| | 2.1.5 | WPCs and the environment | 11 |
| | 2.1.6 | Working and Finishing WPCs | 12 |
| | 2.1.7 | Wood Plastic Composite Application | 13 |
| 2.2 | Thermo | plastic | 14 |
| 2.3 | Polypro | pylene | 15 |
| 2.4 | Fillers. | | 17 |
| 2.5 | Petai B | elalang | 18 |

CHAPTER THREE

| 3.0 Material And Method | | 23 |
|-------------------------------------|---|----|
| 3.1 Raw 1 | Material Preparation | 23 |
| 3.2 Bulk Density Analysis | | 24 |
| 3.3 Wood Plastic Composites Process | | |
| 3.3.1 | Blending Process | 26 |
| 3.3.2 | Making WPC pallet | 30 |
| 3.3.3 | Mould, Hot Press and Cold Press | 31 |
| 3.4 Wood | Plastic Composites Testing | 34 |
| 3.4.1 | Testing sample | 34 |
| 3.5 Testing Method | | 36 |
| 3.5.1 | Tensile Testing | 37 |
| 3.5.2 | Bending Testing | 38 |
| 3.5.3 | Water Absorption and Thickness Swelling Testing | 39 |

PROPERTIES OF WOOD PLASTIC COMPOSITES FROM PETAI BELALANG (Leucaena leucocephala)

BY

LARISSTINA SINTEH NOVEMBER 2006

ABSTRACT

Wood plastic composites was produced from sawdust of Petai Belalang (Leucaena leucocephala) mixed with Polypropylene (PP). To investigate the effect of 10%, 30% and 50% filler loadings on the mechanical and physical properties of wood plastic composites. The results show that the strength decreased when filler loadings increase. The flexural modulus increases at higher filler loadings while the tensile modulus was lowest at 50% filler loading. The physical properties, an increase in the filler loadings resulted in high water absorption and thickness swelling. In conclusion, Petai Belalang sawdust can be used as filler in the manufacture wood plastic composites where strength factor is not necessity.

xii